NASA Ames Academy for Space Exploration

2010

Academy Profile Book
Ames Research Center
Moffett Field, CA

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Introduction

The NASA Ames Academy is a unique summer institute of higher learning whose goal is to help guide future leaders of the U.S. Space Program by giving them a glimpse of how the whole system works. The success of the Space Program results from the interaction of government, academia, and the private sector, each playing a critical and different role in the 50-year-old civil program. Responsibilities overlap, leaders migrate from one sector to another, and interdependence changes with each new administration.

NASA's Charter, written in the 1958 Space Act, gives NASA the main role of using and exploring space for the betterment of humankind. Congress and the President have both supported and restrained NASA as its programs have evolved. President John F. Kennedy's vision of putting a man on the Moon within the decade included much more than the Apollo spectacular of newspaper fame. After Apollo's success, NASA has constantly sought to redefine its goals and fine-tune its schedule every year seeking a budget to match its imagination. We have explored most of the planets, measured the solar system, flown humans in long-term endurance missions and short-term operational missions, invented new technology, and trained Congress, teachers, students, business people, and engineers, developing a whole new generation familiar with the expertise of the "Space Age."

The NASA Ames Research Center

The Ames Research Center (ARC), located at Moffett Field, California, in the heart of Silicon Valley, specializes in revealing new knowledge about the universe, planetary systems, and life science and in creating new technologies that enable exciting new ventures in aeronautics and space exploration. Throughout its history, results from research at Ames have significantly influenced national and international policy, enabled most of the major space missions of the past thirty years, and contributed science discoveries and engineering insights that have rewritten the textbooks. In the process of these endeavors, Ames has made numerous contributions to environmental protection, public health, and the nation’s economic wellbeing.

The NASA Academy at Ames

Ames is unique in having world-class ground, airborne, and space flight research capabilities in aeronautics, astrophysics, earth sciences, astrobiology, fluid dynamics, gravitational biology, thermal protection technology, computational chemistry, planetary atmospheres, space laboratories, information sciences, and spacecraft life support.

As a result, Ames supports all aspects of the NASA vision to expand human presences to the Moon and eventually to Mars and acts as technical bridge to transfer skill, knowledge, and technologies among the NASA activities. This multidisciplinary synergy has created the world's only capability for the comprehensive study of Astrobiology -- life's origin, evolution, and distribution in the universe and destiny, from the protection of our planet to the evolution of terrestrial life into space.

Ames is the lead Center for understanding the effects of gravity on living things. Ames plays a major role in understanding the origin, evolution, and distribution of stars, planets, and life in the universe. One important activity is Ames' unique research in atmosphere and ecosystems science in support of Mission to Planet Earth and the protection of the global environment. In space technologies, Ames is also the lead Center in providing the thermal protection systems that are critical for future access to space and planetary atmospheric entry vehicles.

Ames is NASA's Center of Excellence in Information Systems Technologies, encompassing research in supercomputing, networking, numerical computing software, artificial intelligence, and human factors to enable bold advances in aeronautics and space.

In aeronautics, Ames is the Agency's lead Center in airspace operations systems, including air traffic control and human factors, and the lead Center for rotorcraft technology. Ames also has major responsibilities in the creation of design and development process tools and in wind tunnel testing.

About 1600 civil servants and over 2000 contractor personnel are employed at Ames. In addition, Ames is proud to host more than 500 graduate students, cooperative education students, post-doctoral fellows, and university faculty members who work in collaboration with Ames' preeminent scientists and technologists.

Ames is a pioneer in the application of the multidisciplinary approach in science, technology, and projects, that is, combining the perspectives, training, and technologies of a variety of discipline experts to attack problems of exceptional difficulty. Multidisciplinary approaches are flexible and tend to stimulate cutting edge concepts. Successful application of this technique requires a deep appreciation for the talents, skills, and insights of others and ability to cross-organizational lines to reveal hidden treasures of understanding. Today, more and more scientists and high tech industries are using this approach with remarkable results.

It is in this spirit of shared discovery and the synthesis of diverse talents that Ames offers the NASA Academy at Ames. Students will contribute to every aspect of successful multidisciplinary research on Earth, in the air, and in space, from the formulation of an idea to the procurement of goods and services necessary to develop it, through the management, marketing, and manufacturing necessary to turn a concept into a reality.

Academy for Space Exploration

One goal of the Academy is to provide insight into all of the elements that make the NASA missions possible, while at the same time assigning the student to one of our best researchers to contribute towards one of our missions. Each student will be hand picked by a series of gates -- panels, interviews, etc., starting with their own State Space Grant Consortium who has selected and agreed to sponsor them. The researchers at Ames are selected to provide a diverse set of tasks that covers all aspects of on-going work at the Center. The "match" between student (Research Associate) and researcher (Principal Investigator) will be done by mutual selection.

Sixty percent of the time at Ames will be spent in the laboratory of the selected Principal Investigator assisting in research. About 40% of the working time and most of the social time of the students will be spent as a "group" or "team" in plenary sessions. This time will be devoted to exchange of ideas, on forays into the highest level of decision making, prioritizing, planning, and executing our space missions. This will be done by interviews with leaders and motivators of the space program. Besides the domestic Ames' experts, we will bring in leaders from the aerospace, high-tech, and genetic engineering firms in Silicon Valley; local, state, and national political decision makers; international partners; advocates and adversaries of space exploration.

Activities – June 13th – August 21st

These dates were selected to give most students a breather before returning to school. We know this is a compromise, as no two schools have identical schedules. **It is important that the students begin together and all end together.** The success of this Academy depends not on us as much as all of the students. **We do not accept**

people who are not able to attend this entire period. All students must be U.S. citizens or hold a "green card." Specific exemption may be made if a national space agency is involved.

Our intention is to assure that the students interact as a "team." We will always try to spark their leadership qualities. While we encourage the students to stay together as much as possible, we do not want them to feel trapped. All students will be housed in apartments just outside the main gates of NASA Ames' Research Park. Transportation will be provided each day.

We plan several trips on the weekends. These include trips to the other NASA Centers, such as the Jet Propulsion Laboratories, Dryden Flight Research Center, and Kennedy Space Center in Florida. Shorter trips to Lawrence Livermore Laboratories, Monterey Bay Aquarium Research Institute, the Desert Research Institute and other areas of interest in the West will be made. The selected students will plan additional weekend trips when they arrive. Each of the ten weeks will be a unique group experience, but at the same time the student will be working on a research project with Investigators in the Ames' laboratories or on our flight projects**.**

The Academy Experience

These past 11 summers, 11 - 15 students, interested in life, space, or Earth sciences, space technology, or space engineering came from all over the U.S., were selected for the 10 week session to share a unique experience resulting from their own ingenuity and free spirit. Teaching and learning are not the same. Teaching is the orthodoxy of our universities and colleges; learning is the "ah-ha!" process of finding out and understanding. That is our objective: to foster curiosity, to spirit endeavor, and to inspire leadership.

All of these elements make the Ames Academy a unique experience that will last a lifetime. Students not only participate in the Academy, but are inducted into the larger Academy Family through the NASA Academy Alumni Association (NAAA). It's been said many times by Academy students in the past, and we're sure it'll be true again this summer: "This has been the best summer of my life!!"

Student Support

The NASA Academy program is co-sponsored by the participating NASA Center and the National Space Grant College and Fellowship Program. Most State Space Grant Consortium offices, as well as the Space Grant offices of the District of Columbia and Puerto Rico, support the program. Please check with the Space Grant office in your State for participation information. Space Grant Consortia offices agree to provide the students with summer stipend support and round-trip transportation to and from the participating NASA Center. The participating NASA Center agrees to host the student, providing housing, local transportation, and meals. More information on the National Space Grant College and Fellowship Program is found at: http://www.hq.nasa.gov/spacegrant/

Student Eligibility

Demonstrated interest in the Space Program

Enrolled as a junior, senior, or graduate student (as of June 1 of the program year)

Maintain an overall B plus average (minimum)

Majoring in science (physics, chemistry, biology, etc.), math, engineering, computer science, or other areas of interest to the space program

Be a US citizen or permanent resident (as of June 1 of the program year)

Contact Information

NASA Academy information is obtained through these sources:

http://www.nasa-academy.nasa.gov/

http://academy.arc.nasa.gov

Telephone & email

Tel: (650) 604-2104

EMAIL: brad.bailey@nasa.gov

US mail

Brad Bailey

NASA Ames Research Center

M/S 17-1

Moffett Field, CA 94035

2010 Research Associates

Heidi Beemer

Virginia Military Institute

Lexington, VA

Chemistry

PI: Nathalie Cabrol

Project: Mars Habitability and Life Potential Through Mission Data Analysis and Exploration of Terrestrial Analogs

Email address: beemerhd@vmi.edu

Education and Experience:

In 1997 I was eight years old. The Sunday paper had an iron stained panorama of a boulder-strewn Martian landscape. These photographs began a passion for exploration and discovery of the final frontier's unknowns that remain an integral part of me today. My dream is to become an astronaut geologist dedicated to our exploration of Mars. Even though Mars looked like a dead planet in my newspaper, I know that Mars truly is a very dynamic world that needs to be explored. I want to be involved in the forefront of our research on this mystifying planet; an opportunity that only the Ames Academy will give me. I want to see and experience what working for NASA is like firsthand and I am looking forward to working with the people who make it all happen, day in and day out.

Dealing with the daily challenges of being a cadet at the Virginia Military Institute (VMI) has made me self disciplined, motivated, and relentless in the pursuit of my goals. Meeting the unique demands of the adversarial system hasn't always been easy though--After a full day of physical training, academic classes, and military instruction it is difficult to find the energy and hours to devote to my study of chemistry and astronomy. Life at a military college has certainly given me my share of hardships and headaches, but it has provided incomparable preparation for my future. VMI has taught me the perseverance and tenacity to succeed, the devotion and work ethic to see a mission to completion, the courage to lead and to follow, and an overriding sense of honor and integrity that guides my life.

I am a rising first classmen, or senior at VMI, and a Chemistry major and Astronomy minor. Currently I am conducting research, under the Chemistry Department Head Dr. Darren

Timmons, on the luminescent properties of lanthanide metal complexes. I work in a lab for six hours a week synthesizing reactions and testing different properties of Europium and Terbium in an attempt to create luminescent crystals. This research has given me experience using different instruments including: Nitrogen Dry Box, Molecular Spectroscopy: Nuclear Magnetic Resonance Spectroscopy, UV- Visible Spectroscopy and Crystallography Single Crystal Diffractometer. I have just begun working on my Chemistry Honors thesis which deals with synthesis of metal bound flavone paddlewheel complexes.

In my Astronomy minor, I have gained experience working at the VMI Observatory, using our 20inch reflector telescope. In October of 2009 I led a team of students in a research project to follow NASA's LCROSS lunar mission. With the help of Dr. Topasna we were able to set up and capture CCD images of the impact crater. However, to our and NASA's disappointment we were not able to capture a viable image of the impact.

On The Side:

Surprisingly, I have time for extracurricular activities occasionally! I'm a NCAA Division 1 Goalkeeper for VMI's soccer program, a time intensive but rewarding opportunity to train and compete with an awesome group of women. Next year I will be Alpha Company's Second Platoon Lieutenant and the Vice President of the Cadet Equity Association. The CEA is a cadet government organization I have participating in for two years that is tasked with promoting equity in the Corps and prosecuting breaches of the Superintendent's Statement on Equity. I am also a newly inducted member of Gamma Sigma Epsilon, the national chemical honors society. Recently, I was the Cadet Assistant-in-Charge of the VMI Special Olympics Powerlifting Meet and I have also volunteered with Habitat for Humanity. On the weekends I have to march parade, I like to snowboard, and I love to catch on my sleep--when I can!

Future Plans:

In May 2011 I will graduate from VMI, earning a Bachelor of Science in Chemistry with Honors and a Minor in Astronomy. The summer after graduation I will begin training to commission as an officer in the Air Force Reserve, fulfilling a long time desire to serve my country as a Citizen-Soldier. Afterward I will attend graduate school for Planetary Geology in order to obtain my PhD, focusing on the surface of Mars. Eventually, I want to work for NASA as an astronaut geologist. I know how fortunate I am to have received this extraordinary summer internship opportunity: I plan on making the most of this experience through both my participation in high level scientific research and as a member of the unique culture of the NASA team.

Elizabeth Blaber

University of New South Wales

Sydney, Australia

Molecular Biology and Biochemistry

PI: Eduardo Almeida

Project: The influence of Spaceflight Factors on Biological Function

Email address: e.blaber@student.unsw.edu.au

Education and Experience

In primary school, the only thing that I wanted to do was become a bus driver. That was my sole ambition in life, all my hopes and dreams rested on driving that big bus, and at the time this was all very exciting.

A few years later, in high school, I had an excellent science teacher. She was the kind of person that I thought was a genius, she knew everything! She always had an answer for you no matter how complicated I tried to make the question and she made the lab an interesting place to be. This was my first experience with science and I was hooked. I always looked forward to science class and conducting experiments. I became very interested in biology and medicine. The bus driving would have to wait.

When I arrived at the University of NSW I enrolled in a Bachelor of Medical Science course. I aimed to pursue a career in research and I discovered an honours project concerning space and microgravity and its effects on the human body. I was immediately captivated.

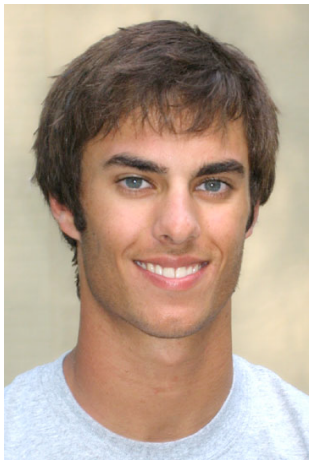
I started reading about the physiological effects of spaceflight and realised that astronauts encountered a vast array of health problems in space. I wanted to know why these health issues were occurring and determine how they could be fixed. I found that a lot of people were looking into the effects of microgravity on specific physiological systems. So I decided to take a broad perspective – I wanted to look at the effects of spaceflight on human beings as a whole. I did this by investigating the effects of simulated microgravity on a pluripotent stem cell line. By

determining the effects of microgravity on protein synthesis at a cellular level, I correlated these results to systems of the body. The research led to more questions than it answered, and I aim to answer some of these questions throughout the remainder of my PhD project.

This research is the only research of its kind being conducted in Australia which led to a lot of media coverage by the Australian Broadcasting Company and also The Australian newspaper. I also presented the work at several conferences, and published a review article in Astrobiology, as well as a scientific article in Australasian Science Magazine.

This is the first year that an Australian student has had the opportunity to attend the Academy and therefore I feel very lucky to be the selected student! This opportunity will enable me to work with some of the top scientists in this field and to build international collaborations to further pursue our common research goals to understand and counteract health problems in space. Additionally, this experience will enable me to generate public and scientific interest in this field of research in Australia. Importantly, I will also be able to use this experience at the NASA Ames Academy to motivate future Australian students to pursue a career in this field. I will be working with the Victorian Space Science Education (VSSEC) to develop curriculum material based on my work and my experience to inspire the scientists of the future. A somewhat grander ambition than the one I started out with!

Alex Bogatko



University of Michigan

Ann Arbor, MI

Aero/Astro Engineering

PI: Friedeman Freund and Gerald Temple

Project: Understanding Warning Signs before Major Earthquakes

Email address: bogatko@umich.edu

Background and Education:

I have always had a fascination with things that fly. My interests began as a child with balsa wood rubberband powered planes and through the years have progressed from model rockets to R/C aircraft to Cessnas to a full out degree in aerospace engineering. My passion extends to the depths of space where cutting edge technologies must be constantly developed to match needs and objectives of the industry. I enjoy being at the forefront of this global field where advancement is constantly pushing the boundaries of what is possible.

I will be graduating University of Michigan in May 2010 with a B.S.E. in Aerospace Engineering and a minor in Multidisciplinary Design. Here, I have had an opportunity to explore a multitude of topics and increase my knowledge in many fields. For the past three years, I have been a member of the Student Space Systems Fabrication Laboratory. We have many different student run projects including a high altitude balloon platform, an electric propulsion thruster, a deployable solar array, and a cubesat. This group focuses on a multidisciplinary hands-on design build test approach that cannot be replicated in the classroom. My first project was the Cansat Competiton, where we placed 3rd nationally. Currently, I research and develop systems for high altitude balloons where we provide a recoverable test bed for integrated systems in a near space environment. Using sun sensors, servo motors and reaction wheels I have created an active attitude determination and control payload. I also have developed and tested various tracking

systems for accurate ground track prediction and recovery. Our team has had many successful launches and is constantly updating and improving our designs. Next fall, I will be returning to UofM to pursue a M.S. in Space Systems Engineering and continue my research.

Along with the coursework at UofM, I am involved with many groups on campus. As an active member of Sigma Gamma Tau, AIAA, and Students for the Exploration and Development of Space, I have been closely involved in the industry that extends from our department, even internationally. In the summer of 2008 I traveled to Toulouse, France where I studied and Supaero and ENAC universities. There, I gained great international experience as we took courses and visited many industries like Airbus and Massier-Dowty. In my spare time I enjoy sports and the outdoors. I have sailed for the Univeristy of Michigan Sailing Team for the past four years. On weekends we travel to different universities across the nation to compete with other teams

The Academy at NASA Ames is one of the best things I could be doing this summer, and I am extremely excited to be a part of it. I know that it will provide me with invaluable experience and open pathways to any field that I choose.

Laura Drudi

McGill University

Montreal, QC, Canada

Medicine

PI: Richard Boyle

Project: Functional and Mechanistic Analysis of the Bystander Effect in the Nervous System

Email address: laura.drudi@mail.mcgill.ca

Education & Experience:

I remember being overcome with awe, feeling a sense of adventure and believing that anything is possible when I looked up to the stars as a child. At the age of 9 years old, while on a class excursion to the Montreal Space Center, my passion for space and my aspiration to become an astronaut began. When confronting my parents with this realization, I was simply met with support but they emphasized hard work as the key to success.

I am currently a second year Canadian medical student hoping to combine my interests in space and medicine as I pursue a career as a flight surgeon, aiming to pioneer a new era of space life sciences research as the endeavors to space exploration continues. It is for this reason I would like to attend the NASA Academy at Ames, in order to learn, enrich my understanding, and gain experience in the space life sciences field.

I worked at McGill's Aerospace Medical Research Unit investigating spatial disorientation. I also reviewed literature on lunar dust toxicity and the implication this poses for operational space medicine. Finally, this past summer, I collaborated with NASA Dryden developing a fatigue risk management policy. I am also working on another literature review investigating the effects of endothelial cell function in microgravity. I attended and presented at various conferences in Montreal, Ottawa, Calgary, Boston, Los Angeles and Daejeon (Republic of Korea).

My interests outside of medical research are varied. I am the McGill Co-editor in Chief of the McGill Journal of Medicine and a McGill varsity rugby athlete. I am also a recreational runner, skier, and I participate in extreme sports such as skydiving, scuba diving and bungee jumping.

I plan on attending the Summer Studies Program at the International Space University in 2011. I then hope to attend an aerospace medicine residency in hopes of practicing as a flight surgeon and conducting space life sciences research. My long-term aspirations include applying to the astronaut-training corps with a hope of representing Canada as an astronaut in a physically and intellectually stimulating career.

NASA Academy would be an opportunity to meet space experts and future colleagues and learn from their expertise. It would also be an occasion to pursue my interests in space life sciences, allowing me to expand on the research I have already conducted. My intention is to be part of this cutting-edge field bringing together all the medical knowledge acquired over the years and applying it to the extreme environment of space. I hope to embark on a journey to become a pioneer, a student, a teacher, and an explorer for the rest of my life. I cannot be more thrilled and I am only filled with humility to discover what lies ahead.

Maxwell Fagin

Vassar College

Poughkeepsie, NY

Physics/Astronomy

PI: Pete Worden and Al Weston

Project: Design of a low-cost Phobos Impactor Misson

Email address: mafagin@vassar.edu

Education and Experiences:

I've been fascinated with space for as long as I can remember.

Living in Colorado, I've been in a perfect position to indulge in this fascination. The thin, cold, dry air at 6000 feet produces fantastic conditions for viewing the stars, and the wide open spaces provide a perfect platform to launch model rockets.

When I was 13, I received a copy of Robert Zubrin's "Exploring Space" as a birthday present. And since then, I have developed a specific fascination with the planet Mars. Zubrin's writings (along with his earlier book "The Case for Mars") have been the biggest literary influence on my love of space exploration. My life goal is to participate in the colonization and terraforming the red planet.

My undergraduate experience consists of a joint program between Vassar and Dartmouth College. At Vassar, I work with the small but exceptional Physics and Astronomy department, and will be graduating this spring with a double major in Physics and Astronomy.

I'm also spending my junior and post-senior year at Dartmouth's Thayer School of Engineering, working towards a B.E. in Mechanical Engineering. At Dartmouth, I work in the physics department's Lynch Rocket Lab on the design and manufacture of CubeSat payloads. We launch our payloads on high altitude balloons and sounding rockets to conduct in-situ

particle counts of the ionosphere, as well as to study wind patterns in the upper atmosphere. My contribution to these payloads has focused primarily on mission operations, communications, and payload assembly.

NASA Academy is a dream come true for me. When I first heard about NASA Academy, I was convinced that it was a perfect experience, and could not possibly be improved upon. But everything I hear from those who have completed the program continues to one-up my expectations. I can't wait to immerse myself among people who have dedicated their lives to pushing the edges of human exploration; as well as work with those who share a passion for space, and a desire to see the day when one of us can put a boot print on the surface of Mars.

Ex astris, scienta. Let's get to it!

Extra-Curricular Activities:

Outside of science and engineering, my next love is theater. I love being on stage, especially in a comedic capacity, and I have performed in at least one major theatrical production each semester since my first year of high school.

I also enjoy science fiction, amateur astronomy, hiking, cross-country, kite boarding and skiing. Member of: The Mars Society, American Institute of Aeronautics and Astronautics, American Radio Relay League, International Thespian Society.

Andrea Gilkey

University of Nebraska

Lincoln, NE

Biological Systems Eng.

PI: Robert McCann

Project: Intelligent Spacecraft Interface Systems (ISIS)

Email address: agilkey@huskers.unl.edu

Education and Experience:

Taking part in research as an undergraduate is absolutely vital to gaining practical knowledge in a particular subject area. Not only will the concepts learned in class become easier to understand, but the excitement of taking part in novel research will be felt early on, putting into perspective the importance of education. By obtaining research experiences in three different areas of biomedical engineering, I have been able to see the big picture of how several areas of engineering come together to improve the quality of life.

The summer after my sophomore year I became a scholar for the Nebraska's Institutional Development Awards (IDeA) Networks of Biomedical Research Excellence (INBRE) program. INBRE is a two year program for undergraduate students, allowing them to take part in biomedical research at one of the three graduate schools in Nebraska. I was given my own project in a biomaterials lab in the biological systems engineering department. My project was to design a vehicle for nonviral gene delivery. Gene delivery is the transfer of exogenous DNA into cells for research or therapeutic purposes. In nonviral gene delivery, a biomaterial is combined with DNA to deliver the desired gene to the host cell. In particular, I investigated the use of a novel biomaterial, zein, the storage protein from corn, as a potential DNA carrier.

After my junior year, I was interested in broadening my knowledge of biomedical engineering to include the area of biomechanics. That summer I interned at NASA Johnson Space Center (JSC) in the Anthropometry and Biomechanics Facility. My project was to evaluate the current seat design of the Orion Crew Exploration Vehicle by taking anthropometry measurements to ensure that crew members of all anthropometry were physically and

psychologically comfortable in the CEV. I became an expert in the CAM 2Q software, which collects information from a FARO Arm measurement system, creating points in 3D space of body landmarks to determine critical body measurements. I had the opportunity to run the experiments and collect body measurements when testing in the full-sized Orion mockup with crew member subjects.

The studies of anthropometry and biomechanics are important in the space program and human space flight, however they also have a broad impact in the areas of rehabilitation therapies. Several medical disorders, such as cerebral palsy, have an impact on movement of the body and it is important to understand this to develop effective rehabilitation therapies. My interest in biomechanics led me to pursue a senior design project on the development of a magnetoencephalography (MEG) compatible bicycle for a physician client. The bicycle will allow therapists to determine the rehabilitation progress of children with cerebral palsy by studying brain activity during pedaling motion. We are finishing the construction of our design and in the early stages of testing the prototype.

This semester I was a member of the University of Nebraska-Lincoln's Microgravity University team. During the fall semester of my senior year our team submitted a proposal to NASA for a systems engineering educational discovery project. Our team was selected and we had the opportunity to work on a project for NASA in the spring. Our project was a cryocooler validation for the VASIMR International Space Station (ISS) demonstrator mission. A prototype VASIMR rocket is scheduled to fly on the ISS within the next five years and the high temperature superconducting (HTS) magnet assemblies of the design require a cryocooler device to keep them at or below 40 K. The goal of our microgravity project was to validate SunPower's cryocooler efficiency levels and cooling capacity in supergravity, 1.8g, and microgravity, <0.1g, environments. Our team designed and built a box assembly to carry and orient the cryocooler and a procedure for measuring and recording the efficiency and cooling capacity of the product aboard NASA's weightless wonder. We spent a week and a half at Ellington Field in Houston finalizing our design and testing the cryocooler on the zero gravity plane.

By having the opportunity to thoroughly examine the areas of gene delivery, biomechanics, and engineering device design, I feel confident in my abilities as a well rounded biomedical engineering student. Now that I have experience starting projects from scratch and carrying them out, I look forward to focusing on one area of engineering and seeing my project through to its completion in graduate school.

Interests:

Outside of my research interests, I enjoy traveling, running, dancing, playing the piano, and martial arts. Traveling provides the ability to see and experience different landscapes and cultures. It amazes me how different the culture and landscape of various areas in the United States alone can be and I will take any opportunity to travel and learn from different cultures. I

run recreationally to ease my mind and take in the surrounding environment. Dancing and playing the piano provide me with ways to express myself physically and emotionally through music. I am currently a first degree black belt in Tae Kwon Do and enjoy the physical and intellectual challenges involved in sparring and the way of life the art form projects through discipline, respect, and overall health.

Future Plans:

I am attending MIT in the fall to begin my graduate studies in Aeronautics and Astronautics. I will be working in the Man Vehicle Laboratory studying the interaction between humans and their environment, specifically the environment of the space suit. This opportunity will allow me to combine my knowledge of biological systems and engineering with my passion for the space program and manned spaceflight.

Albert Jiminez

Columbia University

New York, NY

Computer Engineering

PI: Terry Fong

Project: Robotic Scouting for Lunar Surface Science

Email address: alj2110@columbia.edu

Education and Experience:

I was nicknamed “el cientifico”; my curiosity and constant experimentation convinced my family that I was destined to be a scientist. In particular, I was always fascinated by the space program and its incredible achievements that have placed man and machines in space at unimaginable distances. The vastness of the universe fueled my curiosity as I wondered of the things that are just waiting to be discovered. I can still remember the days when I aimed my telescope at the bright New York City night sky, hoping to catch a better glimpse of the heavenly bodies. Although I was never able to clearly see the Moon or Mars, my excitement for space continued as I dreamt about someday contributing to the space program.

As I got older, my curiosity developed into a passion for engineering and technology. After graduating from high school, I was fortunate to become part of the NASA MUST program, which gave me the opportunity to intern at a NASA center. Since then I have interned at the Jet Propulsion Laboratory for three summers. The knowledge that I have gained and the network that I have established have made the experience the highlight of my undergraduate career. I’ve had the privilege to meet highly motivated and intelligent individuals ranging from high school students to experienced researchers. My childhood feelings of wonder and amazement returned when a JPL researcher pointed his telescope at the clear California night sky and I saw for the first time the rough craters on the moon.

My experience at JPL was filled with such moments. While my interactions with my mentor and other researchers fueled my interest in the space program, the range of research being conducted at JPL exposed me to various potential career paths. In particular, my task of assembling a global digital elevation model, during my first internship, convinced me to pursuit a degree in computer engineering. As a freshman at Columbia University I knew that I wanted to major in a field within engineering and my internships at JPL helped me narrow my focus. By the end of my third summer internship, I had become an expert in my research area. I had expanded the original task of creating a global digital elevation model and created an online interface/database to facilitate the use and formatting of the data. Currently the product has been used by scientists and researchers beyond JPL.

My research at JPL has been an integral part of my undergraduate career and has served as an effective complement to my school work. During the school year, I have been involved in various influential projects ranging from building a radio transmitter/receiver to designing a network on chip; but perhaps the most significant project was actually not related to computer engineering; at Columbia, all engineering freshmen take a course in which groups of students work with a client in the community to research and propose a solution to an engineering challenge. My team's challenge involved designing a bio-diesel powered greenhouse to go on the roof of an elementary school building. I was very enthusiastic to finally apply my knowledge to a "real-world" challenge. As the team leader, I led my team beyond the project's original goals, and I even wrote a website to obtain funding. Apart from the technical challenges, what really motivated me about this project was its didactic potential in teaching the community about the importance of renewable energy. The project was also designed to educate the school's children and to get them excited about science. I've always had a passion for contributing to my community and apart from this project I dedicate much of my time outside of school tutoring younger students.

My passion for community service can be traced back to my mother's example; 20 years ago, she moved to the U.S. from the Dominican Republic, as a single mother, in hopes of providing better opportunities for her children. Since then her actions have been defined by selflessness and sacrifice. She has taught me to have a sense of responsibility and to embrace any opportunity that may cross my path. Today I am taking advantage of NASA Academy in hopes of learning more about NASA and getting one step closer to achieving my goal of contributing to the space program.

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Thibaut Miquel

ISAE - SUPAERO

Toulouse, France

Aero/Astro Engineering

PI: Bill Borucki

Project: Kepler Space Telescope: The Search for New Worlds

Email address: t.miquel@isae.fr

Education and Experience:

Thanks to the Apollo program, and the Voyager and Cassini Huygens probes amongst others, Space Exploration has fascinated me for years. I have always dreamt of being one of the pioneers to push back the frontiers of human knowledge and to discover the uncharted. This is what inspires me to dedicate my professional life to global space programs.

I have consequently worked hard after high school to pass the competitive entrance exam to the French Grandes Ecoles in May of 2008. As I had hoped for, I integrated the SUPAERO Graduate Program at ISAE, a French Higher? School of Aerospace Engineering. I will receive a Master Degree in Aerospace Engineering in September of 2012. Upon graduation, I intend to pursue a Doctoral degree in the same field. The time I have spent at SUPAERO has provided me with amazing opportunities to explore the aerospace field.

Last summer, I did an internship in the satellite Sentinel 2 A.I.T. team (Assembly, Integration, and Test) of EADS Astrium Satellites. I was in charge of issuing communication documents relating to the assembly process that sets detectors on the MSI instrument image focal plain structure. I consequently had the opportunity to work for engineers who had assembled the instruments for the Herschel mission. Their strong interest in the scientific objectives of this telescope and the explanations they gave me regarding its operation aroused my curiosity concerning space telescopes. I also read many articles on the subject after superb photos of the M51 galaxy had been taken with the very same telescope.

In addition to my degree course, I have also been working on a student team project for a Martian entry probe under the guidance of an EADS Astrium system engineer and an ONERA research engineer. This research project is within the context of the ExoMars mission scheduled for launch in 2016.The purpose of this study is to make a preliminary sizing of a surface module, smaller than the actual designs of European missions to come. The surface module must carry a geophysical scientific payload, similar to the Humboldt payload in the first Exomars project. This project will lead to a poster presentation during the seventh International Planetary Probes Workshop in Barcelona.

Extracurricular Interests:

I like skiing and especially love skiing trails. I also practice mountain climbing in summer. I love this leisure activity that combines the thrills and chills to the atmosphere of a trek. I am currently preparing for the Touring Ski Instructor's First Degree (French Federation of Climbing and Mountaineering).

I am also vice president of the youth section of the French Aeronautical and Astronautical Association (3AF Jeunes MIP) which organized interesting visits to French aerospace facilities for students.

I am most of all very excited to be participating in the NASA Academy program at Ames!

Kevin Newman

University of Arizona

Tucson, AZ

Optical/Mechanical Eng.

PI: Peter Jenniskens

Project: Airborne and ground-based observations of natural and artificial meteors

Email address: knewman@email.arizona.edu

Personal Philosophy:

Passionate and diverse are the two words that most prominently come to mind when attempting to describe myself. Since childhood I have always been an explorer, filled with curiosity, a thirst for knowledge, and the spirit of adventure. These characteristics have sparked an interest in science for as long as I can remember. When I was eight years old, my family and I pioneered across the United States on a two month camping trip. One particular campground in Texas served as a host to my first awestruck gaze upon the night sky. I believe it was this moment which first inspired my fascination with space.

"We should take care not to make the intellect our god; it has, of course, powerful muscles, but no personality."

Albert Einstein (1879-1955) US (German-born) physicist

Education and Experience:

The sense of wonder embodied in that childhood camping trip has shaped most of my personal and academic pursuits. As an undergraduate at the University of Arizona in Tucson, I chose to study Optical Sciences and Engineering partially because of the appreciation which telescopes can provide for the past, present, and future of our universe. Upon graduation in May of 2011 I will also obtain minors in Mechanical Engineering and Mathematics.

My research experience started in the summer of 2007 at the Optical Sensors Laboratory of the University of Maryland. As an undergraduate researcher, I fabricated and tested optical pressure and strain sensors to be applied to Army rotorcraft (a NASA funded project). The

experience of working in an optical laboratory setting led to a NASA Space Grant internship with the Center for Astronomical and Adaptive Optics. The project involved verification of mirror quality produced by glass slumping techniques, and measurement of the efficiency of full-spectrum photovoltaic cells. My initial Space Grant project advanced into an additional semester in which I was awarded the opportunity to lead a team of student researchers.

In the spring of 2009 I embarked for a semester of study abroad in Ireland. During my tenure I researched the establishment of an image capturing system for centrifugal micro-fluids. This exciting area of biomedical optics could lead to an integrated commercial lab on a disk platform.

The following summer I participated in a DAAD Research Internship in Science and Engineering (RISE) in the small town of Siegen, Germany. I designed and constructed an infrared diode laser and an atomic beam source for the purpose of trapping ions in a miniaturized surface trap. As an introduction to research in quantum physics, this experience has helped me understand physical optics and their real world applications. Continuing my year in Europe, I joined a group of senior engineering students at the Slovak Technical University of Bratislava. We developed a computer controlled camera inspection system for automated Zebrafish larvae tracking. Upon return to Arizona, I was elected leader of the project.

The extremely rewarding study abroad experience included the opportunity to absorb several foreign cultures, learn new languages, and become familiar with research practices at European universities. During my term I traveled as much as possible and spent time with the local people, learning things about all areas of life which could be found in no textbook.

Goals for the Future:

After graduation in May of 2011, I plan to pursue a Master's Degree in Optics with the possibility of continuing formal education towards a PhD. One of my primary interests in the Academy is to pursue research for the sake of understanding our universe. I find the Terrestrial Planet Finder and Kepler missions of particular interest. My courses in CodeV optical design programming have helped me to understand the process of telescope design and optimization, and I hope to contribute to NASA's mission of space exploration by designing space telescopes in the near future.

Extracurricular:

During the weekends, I spend most of my free time with outdoor activities. After years of hiking, fishing, rock climbing, skiing, boating, and scuba diving, I feel that I have explored some of the land and sea. My next ambition is to explore the air, so I plan to continue taking flying lessons in pursuit of a Private Pilot's License when time and funding permits. One day, I hope to explore part of space as a NASA astronaut.

Sukrit Ranjan

Massachusetts Institute of Technology

Boston, MA

Physics

PI: Nathalie Cabrol

Project: Mars Habitability and Life Potential Through Mission Data Analysis and Exploration of Terrestrial Analogs

Email address: sukrit@mit.edu

Professional History and Motivation

Ever since sighting Comet Hale-Bopp in 1997, I have been hooked on astrophysics. From building experiments for the space shuttle in high school to conducting research on extrasolar planets in college, astrophysics has continued to inspire and drive me. My experiences, both within the classroom and without, have convinced me that I want to pursue research and teaching in astrophysics. In pursuit of this dream, I majored in physics at MIT and have now enrolled in a PhD program in astronomy at Harvard.

NASA has always inspired me. In high school, I participated in the NASA Student Involvement Program, designing, building and executing experiments for NASA vehicles such as the Space Shuttle and suborbital rockets, and high-altitude balloons. Becoming involved with NASA and actually participating in science was a fantastic and inspirational experience, and inspired me to continue research in college. From correcting astrometry software to studying the Earth's ionosphere, from searching for yellow supergiants in M31 to examining the influence of Martian topography on clouds, my passion for the space sciences has continued to drive me.

Most recently, I have been very excited to work on the search for extrasolar planets and evidence of life (biosignatures). Since summer 2008, I have worked to understand how to better detect and model exoplanets, and on how to detect atmospheric biosignatures on these worlds. This is the stuff of science fiction translated to facts! Forty years ago, humans landed on the Moon, establishing a beachhead to the

heavens, forever shattering the divide between the celestial and terrestrial realms that had defined the human experience since the dawn of time. Today, I have an opportunity to participate in the quest to determine whether we are alone in the cosmos. I hope to pursue this quest at the NASA Academy by working in astrobiology or exoplanets, noted strengths at Ames.

I look forward to the Academy as an opportunity to grow not just as a researcher, but also as a leader. I look forward to taking advantage of the team-focused atmosphere of the Academy to learn how to effectively interact with a large research team, both as a member as well as a leader. Leading student groups and research teams at MIT has taught me that team-based work, if done right, is both more rewarding and more productive. I hope to continue to learn how to build more effective collaborations. I further hope to take advantage of my time at NASA Ames to better understand the nature of its exploratory and scientific mission, and to understand how I can best contribute to it.

Extracurricular & Leisure Activities

A central part of my college experience has been the time spent and shared with my friends with whom I hang out and explore MIT, science, and life in general. From planning a community Thanksgiving dinner as a living group Chair to organizing dinner with professors as President of the Society of Physics Students, from organizing game- nights as Strategic Games Society President to late nights spent defending students rights with the Student Committee on Educational Policy, my experiences with my peers have been inspiring and fulfilling.

Teaching astronomy is as important to me as researching it. Every time that I go in front of the students, I recall what inspired me about astronomy. It renews my passion for it. At MIT, I have taken every opportunity available to me to share the wonders of space, from mentoring local students in science fair projects to teaching courses at MIT and in Spain. As a NASA ambassador, I have founded and organized a course that brings local high-school students to MIT, to explore the night sky with telescopes.
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I am an explorer at heart. While astronomy gives me a chance to explore the universe, I also enjoy exploring the air, land and sea of our earth. I enjoy hiking, and from trekking the mountains of New Hampshire with classmates to hiking the Grand Canyon with my fellow astronomers, I have found it a great way to explore nature and bond with friends. Similarly, participating in an underwater archaeological excavation in Italy, taking advantage of a Flying Club scholarship to see the New England foliage from above, and organizing water-gun fights in sailboats on the Charles River have all been great experiences. I look upon going to NASA Academy as not just an amazing academic growth opportunity, but also a chance to experience a whole new level of adventure. I look forward to new voyages of exploration with my fellow Academites.

Corey Snyder

University of West Virginia

Morgantown, WV

Aero/Astro Engineering

PI: Bill Warmbrodt and Larry Olson

Project: Advanced Rotorcraft Aeromechanics Research

Email address: csnyde14@gmail.com

Education and Experiences:

It was early one cold, autumn morning when I first realized that playing with rockets was more than just a hobby for me. Pushing the button myself and watching the model rocket that my mother and I had worked on for weeks soar as high as I could see. I was only eight years old, but even then I knew that rocketry was exhilarating. Watching as a creation of my own, traveled higher and farther than my own two legs could carry me was inspiration enough to pursue an education in the sciences. It wasn't until some years later when I read the adventures of Homer Hickam and the Rocket Boys, a West Virginia native just like me, that I began to realize the opportunities available to me in my own back yard at West Virginia University(WVU) in Morgantown, West Virginia.

As an undergraduate, it is somewhat difficult to secure a research position within a laboratory as an underclassman, so I opted to take the route of applying for individual NASA undergraduate fellowships sponsored by the WV Space Grant Office at WVU. I began with a small turbine film cooling assessment, which then allowed me to secure one of the coveted laboratory positions after gaining some independent experience. My exposure to laboratory research was very broad and allowed me to become familiarized with general laboratory procedures and many types of laboratory equipment. My project was to characterize the mechanical wear of polymers used as coatings for touch-screens. This research was published in the 2009 International Wear of Materials Conference Journal and eventually led me to continue the research abroad at the University of Birmingham, UK during the Summer of 2009. This research was used to write my

Senior Honor's Thesis titled “Material and Wear Characterization of Ultra-High Molecular Weight Polyethylene”.

My experiences at WVU provided me with a multitude of student projects to become involved with but the one that caught my attention was NASA’s Microgravity Research University Project. I joined WVU’s 7th Microgravity Research Team as a junior and spent a year researching, constructing, and developing an aerospace engineering experiment to be flown aboard NASA’s C-9 “Weightless Wonder” aircraft. The skills that I gained during this time were invaluable to me as a student as it gave me a better sense of teamwork and responsibility. This was a commitment above and beyond the classroom and involved studying aspects of engineering that at the time were far more advanced than my classwork. By placing responsibility for a project like this in the hands of students and allowing them to monitor and gauge their own progress, a seed was planted for understanding the value of true teamwork in accomplishing a seemingly insurmountable task.

After my microgravity research I participated in a few internships, one of which was for Northrop Grumman with the NASA Sounding Rockets Operation Contract (NSROC) in Wallops Island, Virginia. As a mechanical engineering intern, I received weekly projects and mentoring from other NASA engineers relating to three dimensional modeling of rocket payloads and rocket motor grain geometries. My internship with NSROC allowed me significant one-on-one experience with knowledgeable engineers working on similar projects. One aspect of this internship that proved to be very beneficial is that I was treated as another engineer in the mechanical engineering team and was included in many milestone reviews for specific missions that I worked on. My time at NSROC culminated in my helping to design and machine components for a major NASA project called the Max Launch Abort System (MLAS) for the Orion Crew Capsule.

All of my experiences, may they be in the classroom or in an industrial setting, have helped to form the person that I am today. On that cold morning, launching a model rocket with the help of my mother it would have been impossible to foresee the path I would take into my future. But I knew that my future would involve real rockets as I pursued a career in Aerospace Engineering. Fourteen years later I was working in a NASA facility on a part that would be included in a project focusing on keeping a new wave of astronauts safe on their journey to the International Space Station. I look forward to continuing on this journey of discovery at the University of Colorado at Boulder where I will be studying towards my Master's in Astrodynamics and of course at the 2010 NASA Ames Academy!

Hobbies: In my free time I enjoy snowboarding and playing basketball. Lately I have been spending more time playing music, taking pictures, and working on cars.

Theodore Steiner

University of Wisconsin

Madison, WI

Mechanical Engineering

PI: Bill Warmbrodt and Larry Olson

Project: Advanced Rotorcraft Aeromechanics Research

Email address: tsteiner2@wisc.edu

Education and Experience:

This summer at the NASA Academy falls right in the middle of an exciting time full of transitions for me. I am graduating from the University of Wisconsin-Madison this May with a degree in Mechanical Engineering with Honors in Research, and next fall I will be starting graduate school at the Massachusetts Institute of Technology. My undergraduate experiences were largely based around robotics and cryogenics, and I will be building on this experience at MIT next year as I move into space systems research.

For the past four years at Madison, I have been actively involved in the UW Robotics Team, which competes in the annual Intelligent Ground Vehicle Competition. By my sophomore year I was the primary mechanical designer, spending the majority of my time either in either CAD programs or the student shop. As a Junior, I served as both the all-team leader and the mechanical team leader, overseeing both the redevelopment of the previous year's unsuccessful competition entry. It was incredibly rewarding to watch the team grow from only four members at the start of the year to over twenty by the end, and achieve the best results at the competition in school history, including first place for design.

During my junior year, I was an undergraduate lab assistant in the UW-Madison Cryogenics Lab for two graduate students, helping to design experiments and collect data. Later that year, I was awarded an undergraduate research fellowship from the UW-Madison Department of Mechanical Engineering to research a new means of increasing the efficiency of Inertance Tube Pulse Tube Cryocoolers (ITPTCs). ITPTCs produce high levels of cooling using an oscillating gas for applications ranging from satellites to MRI machines. I am working with my advisor to develop a test apparatus and data acquisition program to take performance measurements of a new device. I will present my research findings at the International Cryocooler Conference this June.

Last summer, I interned at Boeing in St. Louis, working in the Structures Definitions group. This gave me the opportunity to learn more about the aerospace industry and helped to rekindle my childhood dreams of one day designing aircraft or spacecraft. With this new enthusiasm, I returned to Madison for my senior year and changed my schedule to include courses in aerodynamics and flight dynamics and decided to apply for graduate school and the NASA Academy to further develop these interests. I am incredibly excited about the new direction my research and studies have moved towards in the past year, and I am really looking forward to spending this summer at NASA Ames.

Donna Viola

University of Maryland

Baltimore, MD

Astrobiology

PI: Chris McKay

Project: Life on Mars: Past, Present and Future

Email address: dviola1@umbc.net

Someday, I want to see the world - from outer space! But, unlike many aspiring astronauts, that hasn't been a dream of mine since I was small enough to sit on my grandpa's knee. Rather, I came to that decision at the ripe old age of 16 - shortly after I spontaneously decided that I wanted to be a scientist instead of an author or a journalist. That change was spurred by a few factors, including my high school chemistry class and my involvement in my school's Science Olympiad team. I went through several phases of wanting to study all kinds of science - chemistry, evolutionary biology, entomology, astrophysics, marine biology, geology. My fascination with astrobiology emerged from a growing interest in science fiction, and was bolstered by the fact that it could satiate almost all of my interdisciplinary scientific interests.

I am currently a junior at the University of Maryland, Baltimore County, where I have designed my own major in Astrobiology through the Interdisciplinary Studies department. Throughout my undergraduate career, I have sought a strong scientific background both inside and outside the classroom. My coursework has spanned across a wide range of disciplines, as has my practical experience. I spent the summer of 2008 as an intern in the Entomology Department at the Smithsonian National Museum of Natural History, which involved assisting with a beetle biodiversity project. In 2009, I participated in the SETI Institute REU in Astrobiology, where I analyzed the fluvial geomorphology of Titan using Cassini RADAR imagery. I have also been a part of two crew rotations at the Mars Desert Research Station in the Utah desert, where one of my projects included collecting specimens of endolithic organisms. In addition, I have been working in a research lab in the Biology department at Johns Hopkins University, where I've been analyzing soil samples from the Atacama Desert.

Many of my experiences have been geared towards preparing myself for graduate school and an eventual career. Once I complete my undergraduate degree, I plan on pursuing a PhD in planetary science or astrobiology. After that, I would like to be a research scientist, studying the potential for past or present life on Mars – and, if the opportunity presents itself, I would love to be a part of one of the early missions to Mars to search for life firsthand.

I'm the kind of person who loves being busy. Therefore, I am also very involved on campus outside of my academic and research responsibilities. I am a captain of the UMBC Women's Rugby Club, vice president of the Interdisciplinary Studies Council of Majors, an active member of the Astronomy Club, and a tutor for General Chemistry. If I ever find a spare moment, I enjoy reading, swimming, climbing trees, and adventuring.

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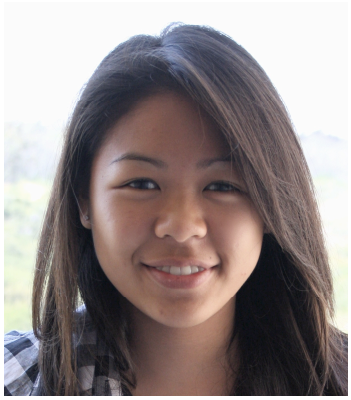
Veronica Wu



University of California – San Diego

San Diego, CA

Aero/Astro Engineering

PI: Stephen Ellis

Project: Studies in Virtual Environments Human Information Processing Research Branch

Email address: veronicawu@comcast.net

Education and Experience

I have always been curious about how mechanical devices functioned, everything from watches and airplanes to a robotic arm displayed at a space museum on a field trip in the fifth grade. When I began learning about outer space in grade school, I noticed I had a keen interest in space shuttles and astronomy. I began collecting news articles on space launches and new discoveries on the moon. Reading those articles inspired me to become a scientist and to work with NASA.

I found out about the engineering field during my sophomore year of high school. After debating whether or not I wanted to major in Mechanical or Aerospace Engineering, I finally settled on Aerospace Engineering in hope of doing research on spacecraft and space exploration after graduate school. I am currently an undergraduate student studying Aerospace Engineering at the University of California, San Diego.

In the first two years of college I have already completed part of my childhood dream of building robots and working with NASA. I participated in a Robot Design Contest in the spring quarter of my freshmen year by designing and constructing a robot built to specific operating parameters, using industry standard tools to develop skills for design and fabrication, and acquiring knowledge of and experience with Autodesk AutoCAD and Inventor and LaserCAMM. After weeks of fabrication and testing, my group successfully built a working robot with two main moving components and won the competition. Currently, I am interning at ISS EarthKAM, a NASA sponsored program that allows middle school and high school students

the opportunity to take photos of Earth from a camera that is situated on the International Space Station. More specifically, I am part of the School Team, which provides support and information to all participating schools during missions and year round. This internship has been instrumental in developing my time management, teamwork, and organization skills. Also, because the program operates on missions similar to those of NASA, I feel as though I am already working with NASA, although on a smaller scale.

Extracurricular Activities

Outside of schoolwork I like to play sports, watch movies, and play board games. I am also the philanthropy chair of Theta Tau, a Professional Engineering Society. Although I do not often play the alto saxophone anymore, I love both playing and listening to music of various genres. I also love to travel; I hope to study in Japan, Australia, or France before I complete my undergraduate education.

Future Plans

After undergraduate school, I hope to pursue Masters and Doctoral degrees in Astronautics Engineering. I am especially interested in the design of the Space Shuttle and planetary rovers. I also have a strong interest in the research and resources NASA has to offer, as I aspire to have a future career at the administration.

I look forward to spending this summer at the NASA Academy at Ames. I am sure that the leadership, team building, and astounding research opportunities will be a rewarding and exciting experience.

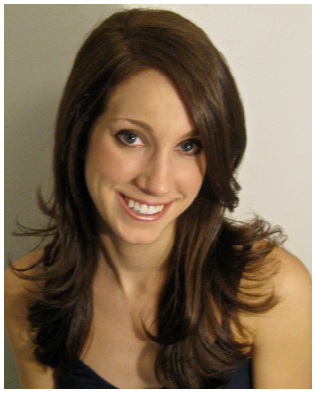
2009 Academy Staff

Heather Duckworth

Columbia University

New York, NY

Astrophysics



2009 NASA Ames Academy Alumni

Email address: had2106@columbia.edu

Ever since I attended the Educational Program for Gifted Youth Summer Program at Stanford University on Einstein's Theory of Relativity, I have had a passion for astronomy and cosmology that is endless and ultimate. At Stanford, I studied special and general relativity and visited the Stanford Linear Accelerator (SLAC). The visit to SLAC opened my eyes and inspired me to pursue my deep rooted interest in Astrophysics. I have continued to follow my academic curiosity and have not stopped learning since years ago. Soon after my journey at Stanford, I continued on to Harvard to take more astronomy courses over the summer. Here I was able to work with telescopes and astrophysics software with labs and stimulations. I was able to experience a taste of the NASA world at Harvard through a few hands on projects. Those experiences at Stanford and Harvard led me to the next step of my journey.

Finally, I have landed at Columbia University and yearn for more every day. This past summer, and currently, I worked on a NASA funded project at Columbia University called GALEX under Professor David Schiminovich. I taught myself how to write computer programs using the Python programming language. This experience unveiled a whole other aspect of astrophysics that I had never seen. I spent days on end perfecting Python programs that graphed thousands of data points, matched 125,000 GALEX images with the low-z catalog from Sloan Digital Sky Survey, separated NUV and FUV data from large fits files, and much more. This Spring I worked to put together a catalog of recently accumulated GALEX data that will soon be released to the public. Working with GALEX has made me realize the incredible impact that astrophysics has on our lives. In addition, I recently took a trip to Kitt Peak and the Keck Telescope in Tuscon, Arizona to work with the 1.3 and 2.4 meter MDM telescopes. I worked with spectroscopy and photometry software to gather data on different types of stars.

My strongest areas of interest are cosmology, black holes, relativity, and quantum mechanics. Following my BA in Astrophysics, I hope to go to graduate school and someday work in the astrophysics world in some capacity at NASA. On top of my research experience last summer at Columbia working with GALEX data, looking into the research and experimental world at NASA will more clearly help me understand how my astronomy education is applied. In Stephen Hawking's words, "I could be bound in a nutshell, but still count myself a King of Infinite Space." I strive to be that King of Infinite Space, well I guess Queen in my case, and one day, my drive and dedication, as evidenced in my eight years of interest in astrophysics and space will lead me to my goals.

Extracurricular Interests: I am also a professional dancer, performing as a Radio City Rockette. In addition to my passion for science, I am a dancer, singer, and actress. I have performed in musical theatre since I was young, and have danced since age three. I was nominated for 2 AriZoni Awards for Best Supporting Actress. On top of dancing, I have also choreographed children's productions, attended All-State Choir, and attended the Interlochen Arts Camp for 2 summers as a flautist.

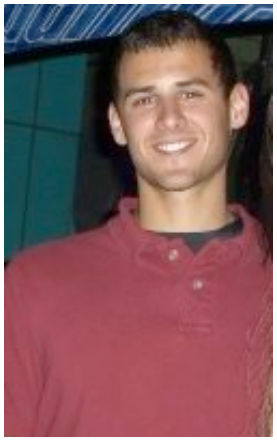
In addition, I have had immense involvement with the American Cancer Society. My mother is a two-time breast cancer survivor. And so, I have been fundraising for the American Cancer Society since I began high school in 2002. I have been Team Captain for Relay for Life, an American Cancer Society fundraiser, for 6 years. Last year, I served on the planning committee for Relay for Life at Columbia University. Also, in 2004, I began a club at my high school called Wolves Pride Against Cancer where I served as Founder and President for two years. In addition, I directed and choreographed a fundraising performance called "Cured: An Upbeat Musical Review." Total, I have raised over $7,000 for the American Cancer Society. This leadership opportunity not only helps the American Cancer Society, but also gives hope to my mother that one day there will be a cure.

Jake Gamsky

University of Kentucky

Georgetown, KY

Physics



2009 NASA Ames Academy Alumni

Email address: shortstop4life30@aol.com

As a young child, I have memories of looking up at the dark night sky and wondering about the vast opportunities for exploration and scientific discovery that it beholds. However, it wasn't until my sophomore year of undergraduate study that I learned about the complex laws of physics and the origin of the universe that I looked up into that same night sky, still full of amazement and wonder and thought about the intricate mathematics and physics that took place in the cosmos.

These thoughts led me to pursue a physics degree from a small, liberal-arts school called Georgetown College in Kentucky. Upon arriving at Georgetown College on an academic/athletic scholarship, I soon realized and appreciated the fact that there were only two physics professors in the entire faculty (and only a handful of physics majors). I was completely fascinated in the fact that almost everything in the universe can be explained or discovered using mathematics. I plan to continue my education and pursue Masters and Doctoral degrees in related scientific fields.

In addition to studying physics, I began the quest to learn more (outside of what my small college had to offer) of how these concepts affect the world around me. This quest led me to NASA. I was fascinated with our country's accomplishments and wanted to be apart of this unique organization. In the summer of 2008, I knew I wanted to devote my career path to the

possibility of becoming an astronaut, someday returning to the lunar surface or being a part of a Mars endeavor.

My passion to study, explore and learn from some of the most brilliant minds in the world led me to an NASA internship at Kennedy Space Center in the spring of 2009. This internship provided me with an incredible research and life-experience opportunity. I conducted research with Dr. Philip Metzger into the properties and compaction of lunar regolith in the permanently shadowed craters of the moon. A few months after that, I was selected to be a part of the prestigious NASA Ames Academy for Space Exploration. I spent an amazing summer researching the toxic effects of lunar dust particles, developing professional relationships, and learning about the vast, complex organization that is NASA.

After 8 months away from the classroom I transferred to a new school, The University of Kentucky (UK), and began a new chapter of my education. I returned to campus rejuvenated about the possibilities in space and space research and founded a SEDS (Student for the Exploration and Development of Space) chapter at UK. In the spring of 2010, I had the opportunity to speak at the 2010 Earth and Space Conference in Honolulu, HI, receive the best student paper award and meet Apollo 17 astronaut Jack Schmitt. I'm deeply grateful to the KY Space Grant and UK for funding this endeavor.

Interests

At Georgetown College I was a baseball Academic All-Conference selection and participated in a number of intramural sports. I also enjoy reading, running, playing golf, weight lifting, swimming, sailing, hiking, video games and listening to people tell of the unique experience and benefit of dedicating their lives to space exploration. I am also scuba certified and would like to go on more dives.

I look forward to the summer at NASA Ames as a staffer and the extraordinary research, leadership, and teambuilding opportunities this unique and selective program offers.

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Douglas O'Handley

Emeritus Director for the NASA Ames Academy for Space Exploration

NASA Ames Research Center

Email address: dohandley@mail.arc.nasa.gov

Doug O'Handley is returning for the 15th year with the NASA Ames Academy. He retired from NASA after 40 years in government and academia in 1999. He is currently employed by Lockheed Martin to continue his activities with the Ames Academy. He teaches at Santa Clara University in the Physics Department.

Doug has an AB degree in astronomy from the University of Michigan and a Masters of Science and Ph.D. in Celestial Mechanics and Computer Science from Yale University.

Upon graduation from the University of Michigan, Doug was employed with the Time Service and Nautical Almanac Offices of the U.S. Naval Observatory, Washington, D.C. After graduation from Yale University, he joined NASA's Jet Propulsion Laboratory and carried out research in celestial mechanics in support of the early Mariner missions to Mercury, Venus, and Mars. He took the challenge to enter management and led research in artificial intelligence and biomedical technology.

After a brief period as staff in the Director's Office at Ames, Doug returned to southern California to work in the private sector at TRW in Redondo Beach. In 1988, he joined NASA Headquarters as the Deputy Assistant Administrator in the Office of Exploration. This was at the period of planning and the announcement of the Space Exploration Initiative by former President Bush to place humans permanently on the Moon and venture on to Mars early in the 21st century.

Returning to Ames in 1992, Doug joined the Space Sciences Division in the Space Directorate.

He is a consultant with Orbitec in Madison, WI. The results of a lunar study carried out with Orbitec can be found at http://www.niac.usra.edu/studies under O'Handley.

Doug is a Fellow of the Royal Society of Medicine, a Fellow in the Aerospace Medical Association, a Fellow of the American Astronautical Society, and an Associate Fellow of the American Institute of Aeronautics and Astronautics. In addition, he is a member of the International Astronomical Union and the International Academy of Astronautics, and the American Astronomical Society. He chaired, for 10 years, the Space Exploration Committee of the International Astronautical Federation.

Christy, his wife, and Doug will be spending more time in Tahoe this summer but will get to know all of you personally. You always are welcome at either of our place in Morgan Hill or Lake Tahoe. You have become part of our extended family by your selection to the Ames Academy.

Brad Bailey

NASA Lunar Science Institute Staff Scientist and Deputy Director for the NASA Ames Academy for Space Exploration

NASA Ames Research Center

Email address: bbailey@mail.arc.nasa.gov

Brad received his B.S. in physics with minors in optics, chemistry and Japanese from Rose-Hulman Institute of Technology. From there, he received his M.S. in astrophysics from New Mexico Tech where he used the Very Large Array (VLA) to qualitatively analyze spectra from pulsars. After working for 2 years at NASA Ames as a hardware engineer for the International Space Station, Brad went back to graduate school at Scripps Institution of Oceanography in San Diego where he got his PhD in marine microbiology and geochemistry. In addition to being the Director of the NASA Academy, he also acts as the senior scientist for the NASA Lunar Science Institute.

In 1998, Brad was accepted into the NASA Ames Astrobiology Academy where he worked with PIs Lou Allamandola and Doug Hudgins on the spectroscopic determination of polycyclic aromatic hydrocarbons in the interstellar medium. He enjoyed the Academy experience so much that he came back in 1999 to work as a staff member for the Academy.

With his varied scientific background, Brad will be a good contact and resource for students looking to break into new fields of interdisciplinary science or for graduate school advice. The academy was a life changing summer experience for Brad as he would guarantee that he would be working at an optical plant as an engineer in Albuquerque, NM without the experience and contacts that the Academy gave to him. Brad is excited to give back to the Academy in this capacity and is looking forward to meeting all of the Research Associates when they arrive in June!

Kristina Gibbs

Section Manager for Lockheed Martin and Director for the NASA Ames Academy for Space Exploration

NASA Ames Research Center

Email address: Kristina.gibbs@nasa.gov

Kristina Gibbs is the Deputy Program Manager for the Academy and the Lockheed Martin Manager overseeing the Academy's daily operations. In addition to this task, Kristina manages support for other NASA organizations including the NASA Astrobiology Institute and the NASA Lunar Sciences Institute. Kristina also has the responsibility for strategic planning and hiring the Academy staff and drivers.

Until recently, Kristina has been working for Lockheed Martin in support of NASA Ames Life Science Payloads for over 15 years. She first started as a liaison between NASA and the Principal Investigators of the Mir /Shuttle payloads, working collaboratively with Russian Researchers. From 1999 to 2002, Kristina was the Project Scientist for two of the first life science payloads in the ISS. As the first Lockheed Martin employee to manage a NASA payload, Kristina facilitated microbiology hardware development and flight operations. Kristina has supported over 10 Mir, STS and ISS payloads and over 20 Principal Investigators . Just over a year ago Kristina was appointed as Manager to the Lockheed Martin Institutes and Collaborative Technologies section.

Kristina is looking forward to your arrival and working with you this summer.

Liza Coe

Code V Program Director for the NASA Ames Academy for Space Exploration

NASA Ames Research Center

Email address: lcoe@mail.arc.nasa.gov

For over 25 years now, I've been making my way to NASA Ames nearly every weekday morning – with the exception of a few swing and graveyard shifts – and also vacations! I began my career designing and developing computer imagery system (CGI) applications for flight simulation at NASA Ames' Vertical Motion Simulator (http://www.simlabs.arc.nasa.gov/vms/vms.html). This work included development of extremely high fidelity imagery for fixed wing and rotorcraft simulation, as well as head-up and head-down displays for the Space Shuttle and military applications. I later focused on incorporating graphic visual displays into wind tunnel data representation.

Having decided to enact my not-yet-middle-age crisis on the career front, I took leave for one year to attend Stanford's Teacher Education Program (STEP) to earn a Master's in Education as well as teaching credentials in mathematics and computer science. After returning to Ames I joined the Education Division and focused on the development of teacher education workshops. However, I had been seriously bitten by the academia bug and returned to Stanford's PhD program in Curriculum and Teacher Education, focusing on science education.

My research has focused on how teachers leverage informal education experiences inside their classrooms. For my dissertation I was lucky enough to be able to work with teachers who, with their students, participated in week-long residential camps at California's Marin Headlands – part of the Golden Gate National Recreation Area and one of the components of the

environmental education-based Yosemite National Institutes. While about half of my research time was spent doing classroom observations and interviews, I got to spend the other half hiking around the gorgeous Headlands and learning as much natural science as I could absorb. My PhD minor is in geology, so I got my fill of sub-duction zone morphology courtesy of the San Andreas Fault which has left its mark in numerous ways on the Headlands.

Prior to the arrival of my two sons I took advantage of every field experience I could talk my way into. I spent several months on a tiny little island off the Katmai coast in Alaska excavating, identifying and cataloguing artifacts from an Indian civilization thousands of years old. Another favorite was spending a summer (their winter) in Western Australia tracing the Devonian extinction boundary in massive limestone and marble exposed reefs. Wanderlust has led me to spend many months (over time) working in and exploring the desert southwest as well as Alaska and, of course, California. If you ever need a travel guide on the West Coast, just let me know!

Now my time and energy (outside of work, of course!) is spent being mom to my two explorers-in-training. I am proud to say that they are world travelers and don't think twice about taking long plane rides to interesting places – if they can watch movies all night! They were both born in Russia and, since coming home have dragged their carry-ons with Mom to Alaska, Hawaii, Mexico, Australia and just about everyplace in between. In between trips they go to second grade while Mom earns the money for the next trip!

My primary responsibility is to ensure the success of the Academy which means that I lead a team of professionals who are dedicated to making the mission of the NASA Academy a reality. I work everything from the "big picture" of what NASA's goals are for the Academy, how the Academy will work (i.e. how to provide cutting-edge research experiences as well as training in leadership and team building) and the organization of experiences outside of your daily research efforts to enhance your learning. This year brings new leadership and staff to the Academy and we are very interested in your thoughts about your experiences and learning so that we can evolve the program to be even better than it is. To this end, I will be conducting evaluations of the program elements as we go through the summer - so every once in a while I will be asking you to take a step back for a few minutes from your everyday activities and reflect on what you've learned and experienced. We're all looking forward to a great Academy and a wonderful summer in Northern California!

Matthew F. Reyes

Exploration Solutions, Inc.

Winter Park, FL

Biology and Astronomy

Academy Staff Member

Alumni of 2000 Ames Academy

Email address: motorbikematt@gmail.com

My history with NASA began in 1996 as an undergraduate at the University of Florida, developing means to analyze & broadcast Jovian Decametric Radio emissions at the UF Radio Observatory. Through funding from the Florida Space Grant Consortium and NASA's RadioJOVE & INSPIRE projects, I developed the first ever internet audio streaming of radio astronomy observations. As a child, I had always loved Astronomy and had dreamed of being an astronaut; so I thought, why not study space itself!

In 1997, astronaut Dr. (and USAF Col.) Cady Coleman suggested I reconsider my path given that most astronauts don't study astronomy while in space. I met Dr. Coleman at UF after a presentation on a mission aboard Space Shuttle Columbia, STS-93. One of her goals was to work on a UF professor's genetically modified *Arabidopsis thaliana* plants for the first molecular biology experiment performed in space. After waiting in line, Dr. Coleman convinced me to consider choosing a major involving plant biology. The very next day I selected Environmental Horticulture; the art and science of cultivating plants in unnatural habitats.

My interest in both astronomy & biology strained the internet's first search engines. Before Google, I still was able to discover the budding field of Astrobiology, and in turn the NASA Ames Academy. I was so intent on entering the Academy, that continuted to apply after two rejections. It was not until my third try that Dr. Douglas O'Handley finally accepted my application for the 2000 NASA Ames Astrobiology Academy, affectionately known as NAABA2k. I worked with Dr. Jeffrey D. Smith on studing Arabidopsis thaliana morphology & starch production in hypergravity. Immediately after the Academy, Lockheed Martin hired me to complete the project over following months.

In 2001, I returned to UF for graduate studies of Plant Molecular & Cell Biology in the same laboratory that developed Dr. Coleman's plant space biology experiment. Under Dr. Robert J. Ferl's supervision, I studied the biochemistry of starch synthesis and the molecular evolution of protein-protein interactions. Dr. Ferl also provided me opportunities to work plant molecular biology experiments in microgravity

aboard NASA's KC-135, the "Vomit Comet". My intent was to graduate with a Master's degree and work at Kennedy Space Center, however, the 2003 Columbia disaster ended the funding, and my dreams of working in space life sciences at NASA.

In 2004 I was contacted by Loretta Hidalgo through the NASA Academy Alumni Association mailing list about a chance to work for the ZERO GRAVITY CORPORATION: the worlds first publicly available microgravity flight experience. The opportunity was irresistable, and in 2004 I suspended my graduate work to eventually become ZERO-G's Director of Technical Operations. With ZERO-G I had been a participant on over 100 flights, oversaw hundreds of educator, research, and tourist passengers, and helped produced and/or appeared in nearly a dozen TV commercials & shows , including the Mythbusters and the feature documentary: "Inspire Me: Weightless Flights of Discovery".

The educational aspects of my work with ZERO-G compelled me to start my own education outreach company, Exploration Solutions, Inc. Through Explorations Solutions, I have worked as a freelancer on a wide variety of education projects of through video & social media. The highlights of my work with Exploration Solutions happened within precisely 6 months of each other, taking me to the oldest landmass on Earth to the newest volcanic rocks to rise from the ocean.

In July 2007, I worked with astronaut and ISS Expedition 10 Commander Leroy Chiao and NASAWATCH editor Keith Cowing at the Haughton Mars Project Research Station in the Canadian high Arctic. While there, Leroy, Keith & I developed webcasts for children viewing our activities at several Challenger Learning Centers across North America. In December of the same year, I worked in the Galápagos Islands, Ecuador with Rollins College and the US non-profit Galápagos ICE: Immerse, Connect Evolve. In service to Rollins College and it's students, I produced videos that highlighted their activities educationg the local Galápageños skills in English, health, and the principles of environmental conservation.

Matthew Frederick Reyes is my full name, though as a result of there being multiple Matthew's in the NASA Academy program, Señor Reyes was the moniker of choice by my Academy brethren. Throughout my adult life I have also worked as a motorcycle mechanic and have ridden thousands of miles upon my pair of Suzuki cruisers. Thus my other nickname is "motorbikematt", which a quick Google search will find more details than I even remember.

Desi Bridges

Program Coordinator for the NASA Ames Academy for Space Exploration

NASA Ames Research Center

Email address: desireemoi.r.bridges@nasa.gov

Desireemoi Bridges is the Program Coordinator for the Academy. Desi has had a hand in coordinating all the operational needs of the 2010 Academy. She gets things done efficiently and with minimal collateral. Desi is available to help you and the staff with any logistical issues.

Desi joined Lockheed Martin over a year ago. In addition to working at NASA Ames, she is studying criminal justice and business management. Prior to working with us, Desi was employed as a funding specialist and software tester in the mortgage industry.

Desi looks forward to working with all of you.